

ABSTRACT OF THE DISCLOSURE

5 A silicon nitride layer having a silicon-rich sub-layer and a standard sub-layer is formed on a copper surface to obtain excellent electromigration characteristics due to the standard sub-layer that is in contact with the copper, while maintaining a superior diffusion barrier behavior due to the silicon-rich sub-layer. By combining these sub-layers, the overall thickness of the silicon nitride layer may be kept small compared to conventional silicon nitride barrier layers, thereby reducing the capacitive coupling of adjacent copper lines.